CLAIMS

1. (currently amended) A method for reducing spurious emissions in an amplified signal by applying pre-distortion, whose magnitude is frequency-dependent, to an input signal to generate a pre-distorted signal, such that, when the pre-distorted signal is applied to an amplifier to generate the amplified signal, the pre-distortion reduces spurious emissions in the amplified signal, wherein the pre-distorted signal is generated by:

(a) generating a first frequency-dependent pre-distortion signal corresponding to a first set of frequency components for the input signal;

(b) generating a second frequency-dependent pre-distortion signal corresponding to a second set of frequency components for the input signal, wherein the first set of frequency components is different from the second set of frequency components; and

(c) combining the first and second frequency-dependent pre-distortion signals to generate the pre-distorted signal, wherein:

the first set of frequency components corresponds to positive frequency components of the input signal; and

the second set of frequency components corresponds to negative frequency components of the input signal.

2. (currently amended) The ~~invention~~ method of claim 1, wherein the phase of the pre-distortion is also frequency-dependent.

3. (canceled)

4. (currently amended) ~~(e.g., Fig. 5)~~ The ~~invention~~ method of claim [[3]] 1, wherein:

the first frequency-dependent pre-distortion signal is generated by:

(1) generating a first set of one or more waveforms corresponding to a first set of one or more pre-distortion parameters;

(2) differentiating the first set of one or more waveforms with respect to time to generate a first set of one or more differentiated waveforms; and

(3) applying the first set of one or more differentiated waveforms to a positive-frequency operation to generate the first frequency-dependent pre-distortion signal; and

the second frequency-dependent pre-distortion signal is generated by:

(1) generating a second set of one or more waveforms corresponding to a second set of one or more pre-distortion parameters;

(2) differentiating the second set of one or more waveforms with respect to time to generate a second set of one or more differentiated waveforms; and

(3) applying the second set of one or more differentiated waveforms to a negative-frequency operation to generate the second frequency-dependent pre-distortion signal.

5-6. (canceled)

7. (currently amended) The ~~invention~~ method of claim 1, further comprising the step of generating a frequency-independent pre-distorted signal from the input signal, wherein the frequency-independent pre-distorted signal and the first and second frequency-dependent pre-distortion signals are combined to generate the pre-distorted signal.

8. (currently amended) The ~~invention~~ method of claim 1, wherein:

the input signal is represented in a base-band domain; and

the first and second frequency-dependent pre-distortion signals are generated in a digital domain.

9. (original) An apparatus for applying pre-distortion to an input signal to generate a pre-distorted signal, such that, when the pre-distorted signal is applied to an amplifier to generate an amplified signal, the pre-distortion reduces spurious emissions in the amplified signal, the apparatus comprising:

(a) a first signal processing path adapted to generate a main pre-distortion signal from the input signal;

(b) a second signal processing path adapted to generate a first frequency-dependent pre-distortion signal corresponding to a first set of frequency components for the input signal;

(c) a third signal processing path adapted to generate a second frequency-dependent pre-distortion signal corresponding to a second set of frequency components for the input signal, wherein the first set of frequency components is different from the second set of frequency components; and

(d) a combiner adapted to combine the first and second frequency-dependent pre-distortion signals with the main pre-distortion signal to generate the pre-distorted signal.

10. (currently amended) ~~(Fig. 5)~~ The ~~invention~~ apparatus of claim 9, wherein:

the first set of frequency components corresponds to positive frequency components of the input signal; and

the second set of frequency components corresponds to negative frequency components of the input signal.

11. (currently amended) ~~(Fig. 5)~~ The ~~invention~~ apparatus of claim 10, wherein:

the first frequency-dependent pre-distortion signal is generated by:

(1) generating a first set of one or more waveforms corresponding to a first set of one or more pre-distortion parameters;

(2) differentiating the first set of one or more waveforms with respect to time to generate a first set of one or more differentiated waveforms; and

(3) applying the first set of one or more differentiated waveforms to a positive-frequency operation to generate the first frequency-dependent pre-distortion signal; and

the second frequency-dependent pre-distortion signal is generated by:

(1) generating a second set of one or more waveforms corresponding to a second set of one or more pre-distortion parameters;

(2) differentiating the second set of one or more waveforms with respect to time to generate a second set of one or more differentiated waveforms; and

(3) applying the second set of one or more differentiated waveforms to a negative-frequency operation to generate the second frequency-dependent pre-distortion signal.

12. (currently amended) The ~~invention~~ apparatus of claim 11, wherein the positive- and negative-frequency operations are implemented using filters.

13. (currently amended) ~~(e.g., Figs. 8-9)~~ The ~~invention~~ apparatus of claim 9, wherein:

the first set of frequency components corresponds to positive and negative frequency components of the input signal; and

the second set of frequency components corresponds to only positive frequency components or only negative frequency components of the input signal.

14. (currently amended) ~~(e.g., Figs. 8-9)~~ The ~~invention~~ apparatus of claim 13, wherein:

the first frequency-dependent pre-distortion signal is generated by:

(1) generating a first set of one or more waveforms corresponding to a first set of one or more pre-distortion parameters;

(2) differentiating the first set of one or more waveforms with respect to time to generate the first frequency-dependent pre-distortion signal; and

the second frequency-dependent pre-distortion signal is generated by:

(1) generating a second set of one or more waveforms corresponding to a second set of one or more pre-distortion parameters;

(2) differentiating the second set of one or more waveforms with respect to time to generate a second set of one or more differentiated waveforms; and

(3) applying the second set of one or more differentiated waveforms to a negative-frequency operation or a positive-frequency operation to generate the second frequency-dependent pre-distortion signal.

15. (currently amended) The ~~invention~~ apparatus of claim 14, wherein the positive-frequency operation or the negative-frequency operation is implemented using a filter.

16. (currently amended) The ~~invention~~ apparatus of claim 9, wherein:

the input signal is represented in a base-band domain; and

the main pre-distortion signal and the first and second frequency-dependent pre-distortion signals are generated in a digital domain.

17. (currently amended) The ~~invention~~ apparatus of claim 9, wherein:

the first signal processing path comprises:

(1) an index generator adapted to generate index values proportional to envelope power of the input signal;

(2) a first look-up table adapted to provide first and second pre-distortion parameters using the index values; and

(3) a first multiplier adapted to multiply the input signal by the first and second pre-distortion parameters to generate the main pre-distortion signal;

the second signal processing path comprises:

(1) a second look-up table adapted to provide third and fourth pre-distortion parameters using the index values;

(2) a second multiplier adapted to multiply the input signal by the third and fourth pre-distortion parameters to generate first multiplied signals; and

(3) a first differentiator adapted to differentiate the first multiplied signals with respect to time to generate first differentiated signals; and

the third signal processing path comprises:

(1) a third look-up table adapted to provide fifth and sixth pre-distortion parameters using the index values;

(2) a third multiplier adapted to multiply the input signal by the fifth and sixth pre-distortion parameters to generate second multiplied signals; and

(3) a second differentiator adapted to differentiate the second multiplied signals with respect to time to generate second differentiated signals.

18. (currently amended) ~~(e.g., Fig. 5)~~ The ~~invention~~ apparatus of claim 17, wherein:

the second signal processing path further comprises a positive-frequency filter adapted to filter the first differentiated signals to generate the first frequency-dependent predistortion signal; and

the third signal processing path further comprises a negative-frequency filter adapted to filter the second differentiated signals to generate the second frequency-dependent predistortion signal.

19. (currently amended) ~~(e.g., Figs. 8-9)~~ The ~~invention~~ apparatus of claim 17, wherein:

the first differentiated signals are the first frequency-dependent predistortion signal; and

the third signal processing path further comprises either a positive-frequency filter or a negative-frequency filter adapted to filter the second differentiated signals to generate the second frequency-dependent predistortion signal.

20. (new) A method for reducing spurious emissions in an amplified signal by applying pre-distortion, whose magnitude is frequency-dependent, to an input signal to generate a pre-distorted signal, such that, when the pre-distorted signal is applied to an amplifier to generate the amplified signal, the pre-distortion reduces spurious emissions in the amplified signal, wherein the pre-distorted signal is generated by:

(a) generating a first frequency-dependent pre-distortion signal corresponding to a first set of frequency components for the input signal;

(b) generating a second frequency-dependent pre-distortion signal corresponding to a second set of frequency components for the input signal, wherein the first set of frequency components is different from the second set of frequency components; and

(c) combining the first and second frequency-dependent pre-distortion signals to generate the pre-distorted signal, wherein:

the first set of frequency components corresponds to positive and negative frequency components of the input signal; and

the second set of frequency components corresponds to only positive frequency components or only negative frequency components of the input signal.

21. (new) The method of claim 20, wherein the phase of the pre-distortion is also frequency-dependent.

22. (new) The method of claim 20, wherein:

the first frequency-dependent pre-distortion signal is generated by:

(1) generating a first set of one or more waveforms corresponding to a first set of one or more pre-distortion parameters;

(2) differentiating the first set of one or more waveforms with respect to time to generate the first frequency-dependent pre-distortion signal; and

the second frequency-dependent pre-distortion signal is generated by:

(1) generating a second set of one or more waveforms corresponding to a second set of one or more pre-distortion parameters;

(2) differentiating the second set of one or more waveforms with respect to time to generate a second set of one or more differentiated waveforms; and

(3) applying the second set of one or more differentiated waveforms to a negative-frequency operation or a positive-frequency operation to generate the second frequency-dependent pre-distortion signal.

23. (new) The method of claim 20, further comprising the step of generating a frequency-independent pre-distorted signal from the input signal, wherein the frequency-independent pre-distorted signal and the first and second frequency-dependent pre-distortion signals are combined to generate the pre-distorted signal.

24. (new) The method of claim 20, wherein:

the input signal is represented in a base-band domain; and

the first and second frequency-dependent pre-distortion signals are generated in a digital domain.